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Strategies for optimizing social jetlag in social work students

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Abstract

The frequently occurring phenomenon of social jetlag is a current problem that stimulates the development of diseases. The starting point for determining social jetlag is time regulation. It is determined by three factors: social time; which determines the interactions and tasks that organize life; physical time regulated by the sun, and biological time; which controls physiology (circadian rhythm). The mismatch between internal time and the social schedule in concert with solar time quanties the social jetlag. At issue is the mismatch between the natural preferences of circadian rhythm and the demands of so-

cial life. This results in different times for waking and sleeping. These cause sleep debt, which portends fatigue, insomnia but also longer-term effects on cardiovascular function, obesity and diabetes rates. For social work students, this phenomenon is particularly important in relation to the nature of the work for which they are preparing. Sensitive perceptions of one's own time preference for work and sleep are part of the self-care toolkit stimulating a reduction in burnout syndrome. The aim of this study is to identify the extent of social jetlag in social work students and to propose effective strategies for its optimization. The quantitative research strategy used predicts effective capture of this phenomenon. Through an original questionnaire distributed to Social Work students in the academic year 2023/2024, the extent of social jetlag was ascertained. The authors' questionnaire was divided into three sections. These identified the hourly distribution of activities (sleep, wakefulness, and eating) on academic and free days, whereas basic demographic characteristics were collected. Statistical processing was performed using IBM SPSS Statistics 28 and Datatab software. The Wilcoxon test was used to compare time metric data within a single group, while dissimilarity was determined in relation to the social schedule (instructional day vs. free day) of the students. Social jetlag was demonstrated in social work students. Through Mann-Whitney U-test, we identified a possible cause of social jetlag in the area of sleep. Extensive analysis of the results identified online strategy tools (Trello, Todoist, Asana, Forest) that can support effective time management and contribute to addressing the issue in social work students.

Keywords:

social jetlag, social work, time management, health, online applications

There is a close link between the chronological social jetlag and the negative consequences on people's health. The study analyses the theoretical, practical and empirical concepts of social jetlag. The initial author of the study is Roenneberg et al.,[1] who has been working on the issue continuously for several years. Resulting from the theoretical background, it is possible to describe social jetlag as a mismatch between the natural schedule of biological functions and the social program that causes desynchronization. The desynchronization itself has a deeper dimension. It is a structural disruption of the consistency of clock times: solar, social and biological. We present a research study seeking to analyze the degree and extent of the presence of social jetlag in social work students. A quantitative research strategy is employed. Several statistical tools such as Wilcoxon test, Mann-Whitney U-test are used for identification and interpretation of social jetlag and are analyzed through IBM SPSS Statistics 28 and Datatab software. Through the analysis, a fundamental factor supporting the mismatch of times has been identified: the need to work during the night and the disregard for basic biological needs such as sleep. Based on this, an online strategy is offered to help manage time effectively.

1. Social jetlag

It is important for the functioning of the organism that there is harmony and harmony between the internal functioning and the external environment. Roenneberg et al.[2] describe that life is governed by at least three types of clocks. These are the social clock (local time), which is subject to interaction and social scheduling. This is followed by solar time, which determines the earth's rotation around the sun and on its own axis. The last category is the biological clock, which governs physiological, biological processes in the body. At the same time, the authors point out that as long as the biological clock is stably synchronized with the sundial (by virtue of the entrainment of light and dark), it forms a synchronous

[1] T. Roenneberg, A. Wirz-Justice, M. Merrow, *Life between clocks: Daily temporal patterns of human chronotypes*, "Journal of Biological Rhythms" 18 (2003) issue 1, pp. 80–90, https://doi.org/10.1177/07487304022396.

[2] T. Roenneberg, L. K. Pilz, G. Zerbini, E. C. Winnebeck, *Chronotype and social jetlag: A (self-) critical review*, "Biology" 8 (2019) issue 3, 54, https://doi.org/10.3390/biology8030054.

period, and this relationship is called "entrainment." The cycle of the circadian rhythm (biological clock) does not last exactly 24 hours. If the biological clock is shorter or longer, it must be shortened by shifting or shortening. In this sense, it is also important to point out that the current form of society contributes to the fact that the harmony of all times, which was historically undisturbed, has been desynchronized. This fact is pointed out Roenneberg[3] and states that historically there has been internal and external consistency. The social clock has been historically phase-consistent with the sundial (external consistency) as well as phase-consistent with the biological clock (internal consistency). While local time appears to remain socially consistent in modern industrialized societies, it has lost both its external and internal consistency. The external inconsistency is due to the introduction of the daylight saving time/winter time divide, which simply shifts social timing with little effect on biological timing. The internal inconsistency is supported by the waning power of clock strike through working in buildings that are not penetrated by large amounts of daylight, evening artificial light that disrupts the natural flow of darkness, as well as the use of smartphones and phones deep into the night. At the same time, all of these factors cause differences between when we work and when we have days off. There are noticeable differences in preferred timing of sleep and activities. These are regarded to be choronotypes whereby their underlying constant variable is the regulation of the circadian clock. The social schedule influences the activity level of each individually. Based on this, a mismatch may arise between the social and natural individual distribution of activities. This phenomenon of mismatch is referred to as **the social jetlag**.[4] The definition of jetlag describes Caliandro et al.[5] as denoting the mismatch between biological time, which is determined by our internal body clock, and social time, which is dictated mainly by social obligations such as school or work. At the same time, the authors note that in industrialised countries up to two-thirds of the studying or working population experience the social jetlag, often for several years.

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3 T. Roenneberg, A. Wirz-Justice, M. Merrow, *Life between clocks: Daily temporal patterns of human chronotypes*, "Journal of Biological Rhythms" 18 (2003) issue 1, pp. 80–90.

4 M. Wittmann, J. Dinich, M. Merrow, T. Roenneberg, *Social jetlag: Misalignment of biological and social time*, "Chronobiology International" 23 (2006) issue 1–2, pp. 497–509, https://doi.org/10.1080/07420520500545979.

5 R. Caliandro, et al., *Social jetlag and related risks for human health: A timely review*, "Nutrients" 13 (2021) issue 12, 4543, https://doi.org/10.3390/nu13124543.

2. Research methodology

The phenomenon of the social jetlag is present to a current degree in almost every segment of the human population. Based on an extensive analysis of studies and research on the subject, the need to identify the presence and extent of social jetlag in the field of social work has been established. The quantitative research strategy was chosen based on a formed objective of the thesis. The aim of the thesis is to interpret the optimal strategy for effective time management aimed at mitigating social jetlag in social work students.

Shaping the background of the social jetlag, it is possible to make a link with the postmodernist approach in social work. Parton and Marshall[6] demonstrate that the importance of postmodern perspectives links a number of social work perspectives that are important to highlight. They are mainly related to rapid change, changing social and environmental conditions, but also to the increase of life uncertainties in society. All these changes are shaping the nature and extent of people's work activities. These include shift work, work at unnatural times, the need for constant presence in the workplace and much more. All the transformations, and the associated transformations in the nature of technology use, have an impact on human functioning on biological needs such as sleep, which is influenced by social jetlag.

We chose a quantitative research strategy to further investigate the social jetlag. Hendl a Remr[7] describes that this type of research is variable-oriented, focusing on describing social variables and their relationships. Within this premise, we focus on identifying social jetlag in social work students. Based on the variables identified, we formulated hypotheses:

a) there is a significant difference between the time students wake up on a free day and the time they wake up on a teaching day,
b) there is a significant difference between the times when respondents consume food on a free day and a teaching day,
c) there is a significant difference between the time when students go to bed on a free day and when they go to bed on a teaching day,

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6 N. Parton, W. Marshall, *Postmodernism and discourse approaches to social work*, in: *Social work*, eds. R. Adams, L. Dominelli, M. Payne, J. Campling, Palgrave, London 1998, pp. 240–249, https://doi.org/10.1007/978-1-349-14400-6_20.

7 J. Hendl, J. Remr, *Metody výzkumu a evaluace*, Portál, Praha 2017.

d) there is a significant difference between the time students go to bed on a free day and on a teaching day.

The author's questionnaire was chosen as the main instrument to measure and identify the prevalence of social jetlag in the research sample. This consisted of three parts: 1. demographic data, which provided information about the respondents; 2. social jetlag, an area containing metric items divided by the schedule of the day into free and academic day; 3. causes and consequences, which consisted of questions aimed at determining the identification of the causes and consequences of social jetlag. The questionnaire contained questions with binomial, metric and scaled items. Statistically, the data were processed using IBM SPSS Statistics 28.0 and DATAtab software. Several statistical tests (Mann-Whitney U-test, Wilcoxon test) were used to validate the data set.

The research population consisted of students of social work at the University of Prešov, Faculty of Arts, Institute of Education and Social Work in bachelor, master and doctoral studies. Students' participation in the research was voluntary. The total population for the criteria set in this way consisted of 117 students based on the generation of the MAIS (Modular Academic Information System). Due to non-fulfillment of the conditions, some of the respondents' answers were excluded and consequently the final research sample consisted of 78 respondents. In terms of demographics and characteristics of respondents, it can be described that within gender, the female gender outnumbered the male gender with 61 females and 17 males. Representation within year groups was identified at all grade levels within each year group. With the largest group being representation from the first year of the Bachelor's degree.

3. Results of the work

A number of findings were identified within the results of the work. The main finding was that social work students demonstrated the presence of social jetlag. The following table shows the results that were identified based on Wilcoxon's test in each area. Where *w* value represents the Wilcoxon test result, *z* denotes the standardized deviation, *p* is the exact p-value, and *r* is the effect size.

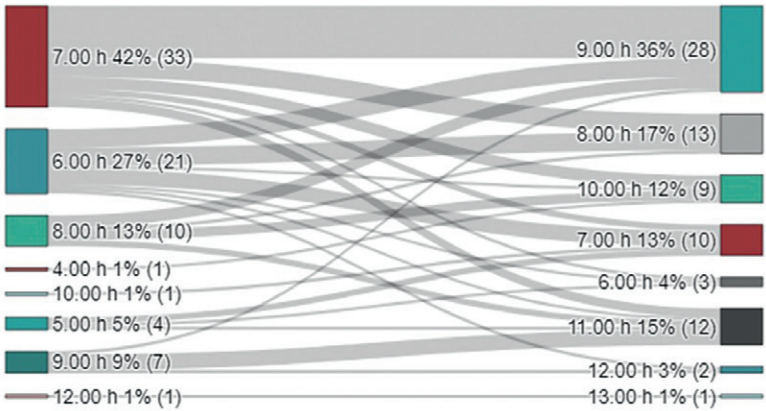
	Awakening	1. meal	2. meal	3. meal	preparation for sleep	settling into bed	sleep
w	558,5	917	1199	956,5	882	407	249
z	–2,65	– 0,83	–0,05	–0,96	–0,67	– 2,79	–3.31
p	0,008	0,406	0,959	0,339	0,502	0,006	0,001
r	0,3	0,09	0,01	0,11	0,08	0,31	0,37

Based on the highlighted results, it is possible to view the significant domains of Waking up, Getting into bed, Sleep as those in which social jetlag is demonstrated. Within the other domains, significant results were not demonstrated to identify social jetlag within the population. We also described the more closely identified domains by the time block of hours formed for all significant domains. The Waking up area is one of the worst for the overall set given that for the entire set only 6 respondents have no identified social jetlag in that area. Thus, students overwhelmingly wake up at different times for free and instructional days At the same time, the largest range of hours in this area is from 0 to 6 hours with 6 hours representing a very large shift.

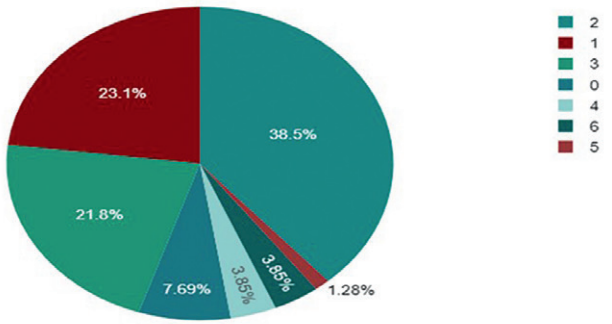
3.1. Interpretation of results

Awakening

Overall, social jetlag was found in this area in up to 73 students and was not detected in 5 cases. From the descriptive statistics, it can be described that the students had different wake up time during the free day compared to the class day. On days when students had classes, the (Mdn = 3 [6:00 h]) range was from 4:00 h to 12:00 h. On days when pupils did not have lessons, the (Mdn = 4 [9:00 h]) range was from 6:00 h to 1:00 h. This is a difference of 3 hours for Mdn. The data is shown in the following chart with the first column showing the times of instructional days and the second column showing the times of free days.



The number of jetlag hours ranged from 1 to 6 hours. The most frequent areas were 2 hrs 38.5%, 1 hr 23.1% and 3 hrs 21.8%. The distribution of hours is demonstratively shown in the following graph.

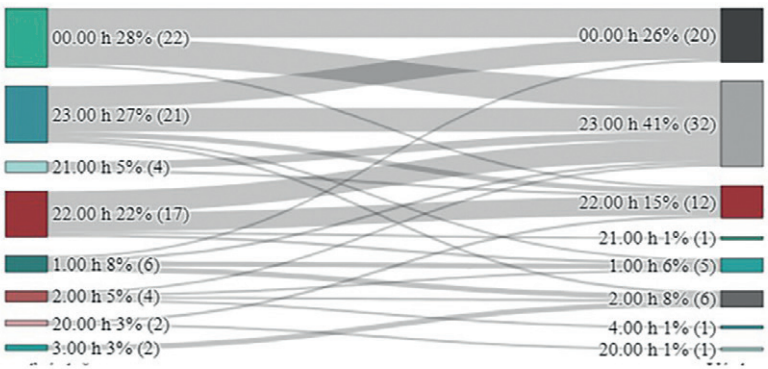


Differences between days (free/teaching) were tested by Wilcoxon test, which showed that the difference between days was statistically significant W = 558.5, p = 0.008. The p-value of 0.008 is below the set significance level of 0.05 which supports the significance of the test. The effect size r is 0.3, which is a medium effect. The significant data is shown in the following table.

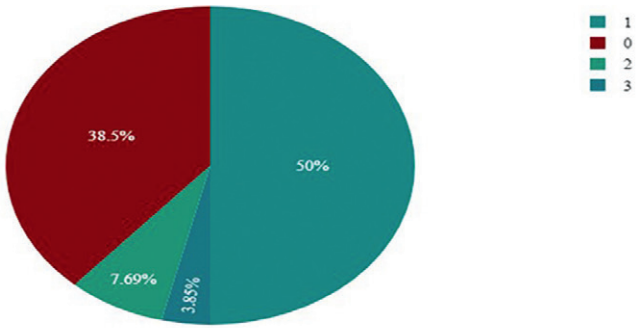
Awakening	n	average	Mdn	Standard deviation
Teaching	78	3.33	3	1,78
Free day	78	4.05	4	1,77

Settling into bed

The descriptive statistics in the area showed that 48 respondents had social jetlag present and 30 respondents did not have social jetlag present in the area. For both groups it was the same (Mdn = 3, [22:00 h]), with the time range being between 20:00 h and 3:00 h for the free day and between 20:00 h and 4:00 h for the teaching day. We show the detailed distribution in the following graph. The first left column is the free day and the right column is the instructional day.



The range of jetlag hours ranged from 1 h to 3 h. With the highest number of respondents was 1 hr (39 respondents), 2 hr (6 respondents), 3 hr (3 respondents). The distribution of hours is shown in the following graph.



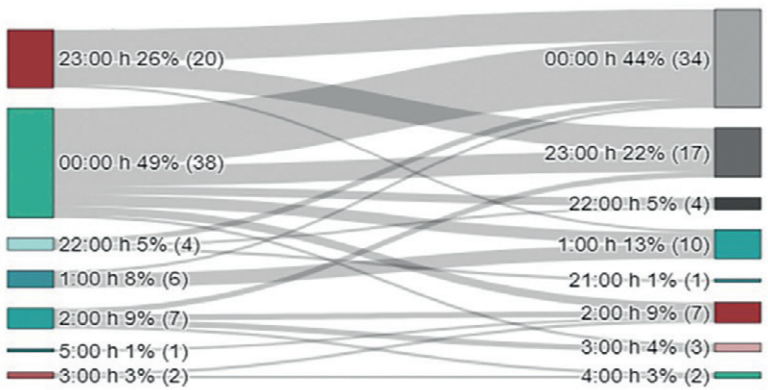
To test the significance of the difference between the free and instructional day, a Wilcoxon test was conducted, which showed that there is a statistically significant difference between the times students go to bed on the free and

instructional day W = 407, p = 0.006. The p-value of 0.006 is below the set significance level of 0.05. Therefore, the result of Wilcoxon test was significant for the data. The effect size r is 0.31. At r = 0.31, this is a medium effect.

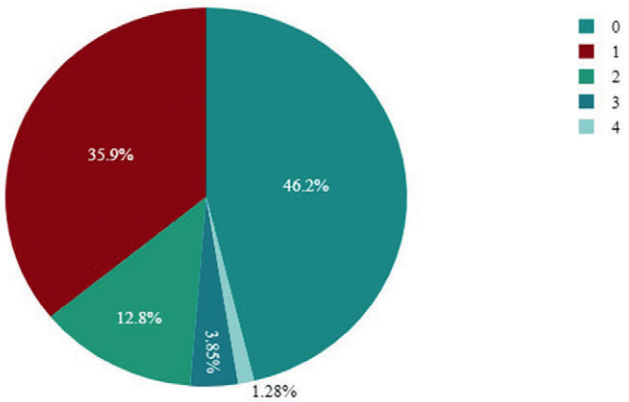
Settling into bed	n	Average	Mdn	Standard deviation
Lessons	78	3.67	3	1,59
Free day	78	2,96	3	1.44

Sleep

In the area of Sleep, descriptive statistics can be used to determine that the presence of social jetlag was identified in 42 cases, and in a number of 36 students the presence was not identified. Students on both free and academic days had the same high value (Mdn = 3). On academic days, the range was from 22:00 h to 5:00 h and on free days the range was from 21:00 h to 4:00 h. The Mdn for teaching days is 00:00 h and the Mdn for free days is 23:00 h. This is the hourly difference between free and teaching days. The Sankey diagram shows the difference between a free day and a teachin day.



Regarding the difference in the number of hours between the free day and the teaching day, there was a difference of 1 h (35.9%, 28 respondents) to 4 h (1 respondent, 1.28%) for the social jetlag in this area.

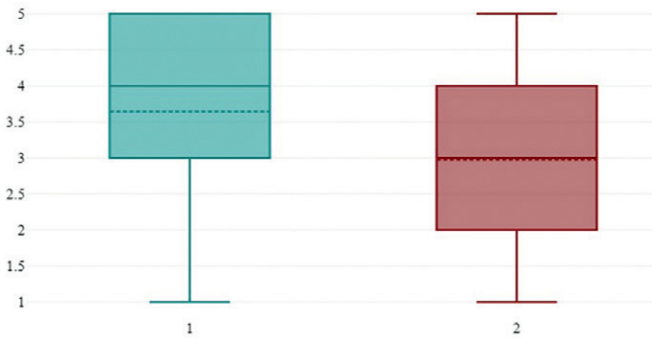


Confirming the differences between the groups, Wilcoxon test showed that the difference between working and free day was statistically significant, W = 249, p = 0.001. The p-value of 0.001 is below the set significance level of 0.05. Therefore, the result of Wilcoxon test was significant. The effect size r is 0.37. At r = 0.37, there is a medium effect size.

Sleep	n	Average	Mdn	Standard deviation
Lessons	78	78	3.03	3
Free day	78	78	3.19	3

The interpreted results clearly show the prevalence of social jetlag in social work students. The reason in question can be analyzed through further testing. Mann-Whitney U-test was conducted for social jetlag and sleep to the variable of sleep deprivation. Through the analysis of the answer to the question – "I delay sleep so that I can/can work during the night" – was (Mdn = 4) for the group in which social jetlag occurred and (Mdn = 3) for the group in which social jetlag did not occur. A Mann-Whitney U-test conducted for the above data showed that the difference between the groups with and without social jetlag for the sleep domain was statistically significant, U = 560, n1 = 39, n2 = 39, p = 0.046. The effect size *r* was 0.23. which is a small effect. The magnitude of the difference is insignificant in the following graph with No. 1 indicating the presence of social jetlag and No. 2 indicating its absence. Based on this test, it can be determined that the group for whom social jetlag was demonstrated agreed to a greater extent with the statement "I delay sleep so that I can/can work during the night"

Thus, to a greater extent they ignore their own sleep preferences and disrupt the natural adjustment of circadian rhythms.



4. Discussion

For the above data, it can be characterized that the social jetlag represents a significant and frequently occurring phenomenon in society. In the following overview, we present the individual negative consequences.

The application dimension of social jetlag is described by Haraszti et al.[8] and report that social jetlag is negatively correlated with academic performance in college students. The authors point to several underlying causes. The first is that the research was conducted in Hungary due to which the time zone is in Central European orientation and thus sunlight had a large influence on the chronotype. They also point out that the negative effect of social jetlag is demonstrable on weekly average benefit. At the same time, these claims are supported by other findings showing that there is a relationship between sleep time and academic performance. Students who go to bed at later times perform worse in the morning. Negative health consequences are described by Parson et al.,[9]

[8] R. A. Haraszti, et. al., *Social jetlag negatively correlates with academic performance in undergraduates*, "Chronobiology International" 31 (2014) issue 5, pp. 603–612, https://doi.org/10.3109/07420528.2013.879164.

[9] M. J. Parsons, et al., *Social jetlag, obesity and metabolic disorder: investigation in a cohort study*, "International Journal of Obesity" 39 (2015) issue 5, pp. 842–848, https://doi.org/10.1038/ijo.2014.201.

who report that obesity and metabolic disorders are significantly related to the social jetlag. Due to the fact that an unnatural environment for functioning is created (one that is not in alignment with the biological clock), it generates a negative shift in the body's functioning that causes disruptions in sleep timing, energy homeostasis, and overall disruption of circadian rhythms. It is the degree of circadian disruption that causes the misalignment in the functioning of the organism that is the guiding factor. Similarly, it states Levandovski,[10] that the social jetlag is a risk factor for the development of depression. Significantly, they point out that therapies that focus on changing the clocks in accordance with light therapy, sleep deprivation, and a strict time schedule offer effective treatments. Concurrently, Wongová et al.[11] characterize that work that has a natural time schedule characterized by a mismatch between endogenous rhythms and social time may promote metabolic factors that predispose to diabetes and atherosclerotic cardiovascular disease. Complementary Beauvalet Castilhos et al.[12] argue that this social jetlag is objectionable in several respects. The primary one is the stimulus itself, which gradually disrupts the structure of the natural sequence of biological processes, while at the same time it is an aspect of the consequences, which include the area of health and behavioural processes. Among the main consequences, the authors rank epilepsy, various psychiatric symptoms, mood disorders, cognitive disorders, excessive use of stimulants, cardiometabolic risk.

As we have shown, the social jetlag issues have a negative impact on health, academic performance, and overall body functioning. We point out the need to address the topic especially in the long term through various remediations. One of them is to address time management for productive and non overwhelming studying in students. We take a solution-focused approach in designing the solution.

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[10] R. Levandovski, *Depression scores associate with chronotype and social jetlag in a rural population*, "Chronobiology International" 28 (2011) issue 9, pp. 771–778, https://doi.org/10.3109/07420528.2011.602445.

[11] Wong C., Odom S. L., et al., *Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review*, "Journal of Autism and Developmental Disorders" 45 (2015) issue 7, pp. 1951–66, https://doi.org/10.1007/s10803-014-2351-z.

[12] J. Beauvalet Castilhos, et al., *Social jetlag in health and behavioral research: a systematic review*, "ChronoPhysiology and Therapy" 7 (2017), pp. 19–31, https://www.dovepress.com/social-jetlag-in-health-and-behavioral-research-a-systematic-review-peer-reviewed-fulltext-article-CPT (25.07.2024).

In this respect it is important to note that according to Murray et al.[13] is a Solution-Focused, Future-Focused Approach. It helps to move towards a future that should build on present solutions. In addressing this issue, we focus on the design of online tools that support student time management.

In the following section, we will present several online tools that have the potential to improve time management and working with assignments and tasks. These online applications or tools include: 1. Asana; 2. Trello; 3. Forest; 4. Todoist.

Asana

It is an online tool that also doubles as a phone and computer app. It is a tool that manages work efficiency. It allows for an active monitoring progress, collaborate, highlights the advised features for assigning tasks, tracking time, creating projects, goals, tasks, as well as it serves as a database for files that can be pasted to projects. For the user, it offers a comprehensive analysis of progress, distribution and scheduling of tasks and time. It is possible to figure in and choose the free version or the Premium version. The difference is mostly just for the possibility of collaboration and the number of collaborators.[14]

Trello

Through a mobile or online application, it is possible to work on your tasks in a very simple way. Trello is a tool that organises tasks through tables. It is possible to move tasks between columns to track progress. The user interface is intuitive and simple for organizing tasks. It is available as a free version but also the Premium.[15]

Forest

It is a mobile application that is primarily focused on concentration and increasing productivity at work. Its principle consists of planting trees, which are conditioned to grow (the tree grows only if the study mode is set in the application and this is not interrupted by opening other windows on the phone). It offers

[13] S. Murray S., et al., *Time management for STEMM students during the continuing pandemic*, "Trends in Biochemical Sciences" 47 (2022) issue 4, pp. 279–283.

[14] https://help.asana.com/hc/en-us/articles/14250783001627-How-to-start-using-Asana (25.8.2024).

[15] https://trello.com/tour (25.8.2024).

the possibility to track productivity through the visualization of the number of trees. The user navigates the app very easily as it doesn't have many features.[16]

Todoist

It is an application whose main task is personal management of simple tasks. It is possible to schedule tasks and deadlines. It offers possible synchronization between devices via online access or mobile app. The user can intuitively organize time and tasks. It is accessible affordably in a free version or the premium version with extended features.[17]

All these online features offer scope for efficient time management. Optimal allocation of daily time for responsibilities is granted. Free time can help to ensure that students are not in a time crunch and do not have to postpone sleep in order to work on assignments during the day. Every single app has a different focus. The most comprehensive tool appears to be Asana, which offers a space for detailed project organization to track progress. It can be updated constantly while keeping track of every task since its platform is also available in an app on the phone, on the computer or on the web. However, at the same time, its disadvantage is that it is more demanding and difficult for the user as it requires a detailed planning of each area which may not be maximally useful for students. A simpler option can be Todoist, it is a very intuitive tool that neatly organizes all the tasks including dealines. The latter may be more accessible due a simple language and the lower level of functionality.

Within the formulation of conclusions it is possible to determine that the stated hypotheses:

(a) There is a significant difference between the time students wake up on a free day and the time they wake up on a teaching day,
(b) there is a significant difference between the times when respondents consume food on a free day and a teaching day,
(c) there is a significant difference between the time students go to bed on a free day and on a teaching day,
(d) there is a significant difference between the time students go to bed on a free day and on a teaching day.

[16] https://www.forestapp.cc (26.8.2024).
[17] https://todoist.com/cs/help/articles/whats-new-WV4aRXKsN (25.8.2024).

The hypotheses were tested and the results confirmed the hypotheses in three cases (a, c, d) while in one case the hypothesis was not confirmed and was refuted (b).

Conclusions

The phenomenon of social jetlag is a risk that can cause several very negative consequences for physical and mental health. A high prevalence of social jetlag has been demonstrated in social work students. The need to identify possible solutions to reduce social jetlag is highly desirable for the formation of healthy lifestyles and learning optimal work habits that promote healthy lifestyles, resilience to negative potential phenomena such as burnout syndrome, etc. A possible cause of jetlag was also identified as a lack of perception of one's own physiological needs (sleep) and consequently the implementation of studying at night. Through those findings, strategies were formulated towards optimizing the time schedule. Productivity, time and studying must be silfully managed and organized so that assignments and tasks are not needed to be performed at night.

Note: The paper was published in the framework of the projects VEGA No. 1/0535/23 Integration of Ukrainian Migrants and Assessment of the Difficult Life Situation Associated with the Crisis Induced by the War Conflict through the Lens of Social Work and KEGA No. 027PU-4/2022 Transfer of Digital Technologies into the Innovation of the Methodology of Professional Practice in the Undergraduate Preparation of Students of Social Work.

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Caliandro R., et al., *Social jetlag and related risks for human health: A timely review*, "Nutrients" 13 (2021) issue 12, 4543, https://doi.org/10.3390/nu13124543.

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Levandovski R., et al., *Depression scores associate with chronotype and social jetlag in a rural population*, "Chronobiology International" 28 (2011) issue 9, pp. 771–778, https://doi.org/10.3109/07420528.2011.602445.

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